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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,139	12/01/2003	Justin Sato	03-0469	2655

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EXAMINER	
DESTA, ELIAS	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 08/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/725,139	SATO ET AL.	
	Examiner	Art Unit	
	Elias Desta	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 3-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

Claim rejection – 35 U.S.C. 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1-6 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Plotting the integrated value to determine the effects of a predetermined parameter does not constitute a concrete and tangible output. The idea of determining the effect of a pre-determined parameter is merely establishing a relationship among the parameter values. Further, plotting the values is another way of tabulating data points already collected for subsequent analysis. The outcome of this process does not amount to a useful, concrete and tangible result.

The claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson,

383 U.S. 519, 528-36, 148 USPQ 689, 693-96); In re Ziegler, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)).

A claim is limited to a practical application when the method, as claimed, produces a concrete, tangible and useful result; i.e., the method recites a step or act of producing something that is concrete, tangible and useful. Referring to the "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" in determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete."

The tabulated data may be useful for characterizing or studying the relationships that yet to be established or determined. The process or the method doesn't constitute a new discovery or an improvement of doing things. Therefore, in the absence of concrete and tangible concept, these claims are deemed to be non-statutory.

Claim rejection – 35 U.S.C. 112

3. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are:

In reference to claim 1: "A method of analyzing a plasma" is actually indefinite. It should be something like, 'A method of analyzing 'an RF signal

response of a plasma' or ' dynamics of a plasma' or 'non-steady state of plasma' using an RF signal'. Further, it is not clear what range is included in plotting the integrated value (whether it is a spatial or time distribution) and what RF value (before or after igniting the plasma) is used to carry out the computation and then plotting the value.

Applicant has also recited the limitation "an RF signal monitor" in lines 2 and 3 of claim 1. It is not clear whether the system has one, or two, signal monitoring units specific for monitoring and/or calculating the value needed for carrying out integration.

In claim 1, applicant has recited a step that "integrates the calculated value over a period of time", however, the instant specification in page 6, lines 5-7 talks about having a step of "RF signal curve" being integrated effectively and separating various phases of the signal. The step noted in the specification is an integration of "RF signal curve". The integration of the "RF signal curve" is the same as carrying out a 'double-integration' on the data points noted in claim 1, whereas the integration noted in claim 1 is a 'single-integration' of data points per se. Therefore, the 'double-integration' step noted in the specification is conceptually different from the 'single-integration' idea presented in claim 1.

Claim rejection – 35 U.S.C. 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Coumou* (MKS Instruments, 'Advanced RF Metrology for Plasma Process Control') in view of *Frederico et al.* (IEEE Article, 'Silicon Sacrificial Layer Dry Etching (SSLDE) for Free-Standing RF Memory Architecture', hereon *Frederico*).

In reference to claims 1 and 5: *Coumou* teaches the method of analyzing RF signal response of plasma in semiconductor manufacturing (see *Coumou*, page 1, paragraph 1 and Fig. 1). The method includes:

- RF power delivered to the plasma constitute igniting the plasma with an RF signal because it is inherent that the RF power delivered to the plasma chamber is to ignite the plasma for the purposes of analyzing the plasma (see *Coumou*, page 1, paragraph 2, last sentence and Fig. 1);
- Monitoring the RF signal, as the RF signal is used to ignite the plasma (see *Coumou*, page 2, paragraphs 1-4, under RF signal processing and Fig. 2);
- Calculating a value based on the RF signal, because the principal RF metrology includes an optimization process, which involves calculating a value such as dynamic range and other parameters (see *Coumou*,

page 2, paragraph starting "Principal RF metrology design challenges"); and

- Integrating the calculated value over a period of time to determine effects of a pre-determined parameter is inherently included in *Coumou*, because the advanced signal processing scheme used in *Coumou* implements a CIC (Integrator Comb Filter) where the low pass filter extracts the sum frequency and any other undesirable frequencies that may be contained in the spectrum. Further, a DSP acquire the data from the data channel through a parallel interface, converts the complex data from the Cartesian to Polar coordinates, and applies a scaling algorithm to convert the measured values or parameters to equivalent RF values (see *Coumou*, page 4, Fig. 4 and RF Metrology Results).

However, *Coumou* does not teach plotting the integrated value to determine the effects of a predetermined parameter. *Frederico* teaches a detailed experimental study concerning the influence of the most relevant etching parameters and design parameters (see *Frederico*, page 570, 'Releasing Step Investigation', and Figs. 5 & 6).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify RF metrology for plasma process control as taught by *Coumou* and incorporate a plotting scheme noted in *Frederico* in order to

plot the measured values that are already computed and monitored in *Coumou*, which are associated with the plasma chamber, because plotting the values, such as power source, temperature, opening size and pressure (see *Frederico*, Figs. 4-7) provide a better operational parameter estimate for the purposes of understanding the etch or under-etch rate of a plasma process.

With regard to claims 3 and 4: *Coumou* further teaches that the method uses the integrated value to calculate the etch rate, because by controlling and monitoring the actual plasma impedance and RF power delivered to the plasma contribute the parameter required to compute the etch rate (see *Coumou*, page 1, 2nd paragraph).

Conclusion

6. Citation of pertinent prior art:

- *Chen et al.* (U.S. Patent 6,924,455) teaches integrated plasma chamber and inductively coupled toroidal plasma source.
- *Donohoe* (U.S. PAP 2005/0173376) teaches a method for etching a wafer in plasma etch reactor.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elias Desta whose telephone number is (571)-272-2214. The examiner can normally be reached on M-Th (8:30-7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)-272-2216. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Elias Desta
Examiner
Art Unit 2857

- E.d

July 19, 2006

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800